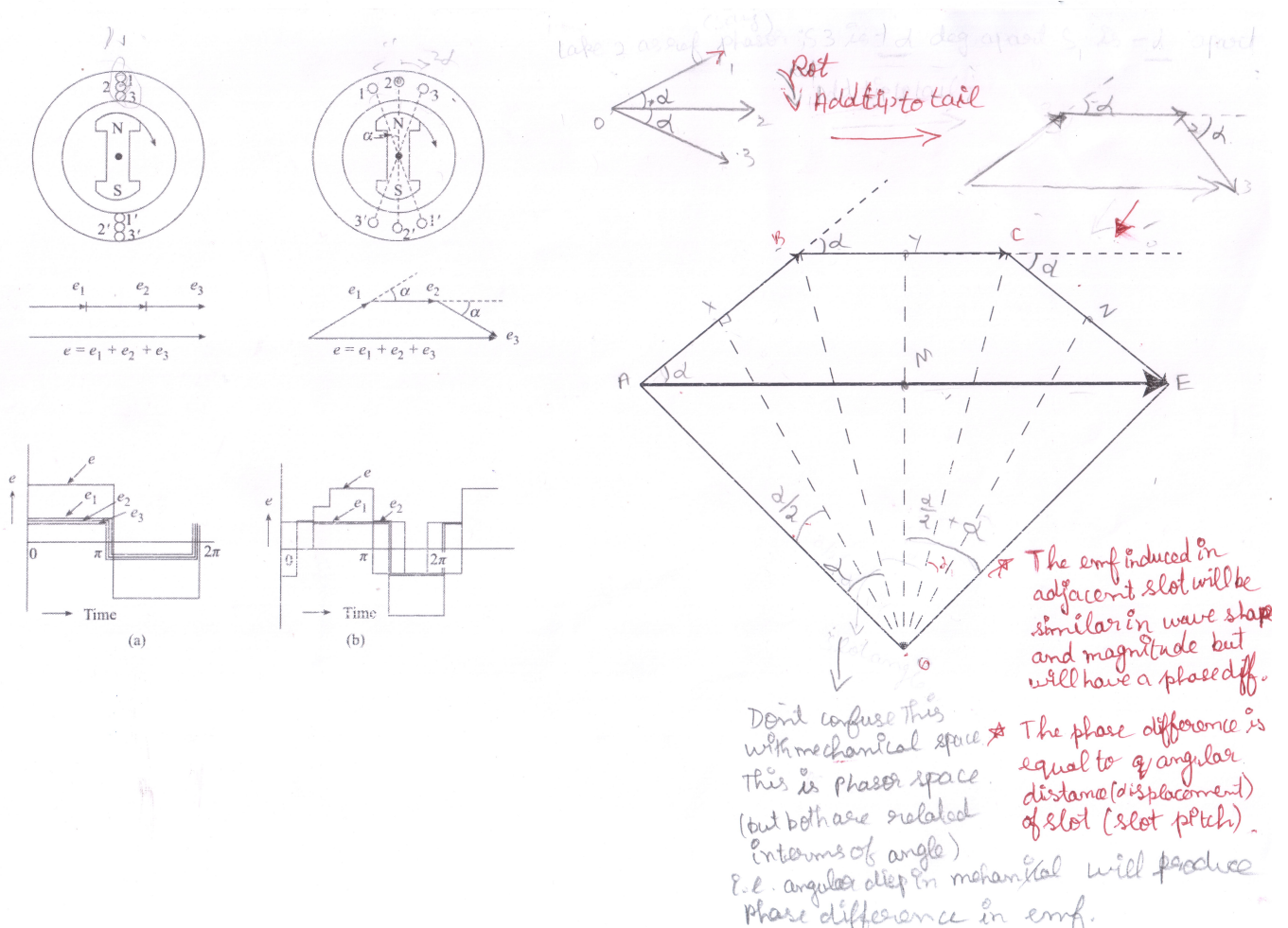


Distribution factor A.K.A breadth factor.

Watch it! Phasor sum of emfs animation

- The E.M.F. induced in the conductor of **adjacent slot** will be **similar in wave shape and magnitude** but there is phase difference between them.
- This difference is equal to angular displacement of slots(slot pitch).



Distribution factor.

Finding Phasor sum.

$$E = AE \Rightarrow AM + ME \Rightarrow 2AM \left[\because AM = ME \right] \rightarrow (1)$$

Find AM and subs in (1).

$$\text{In } \triangle OME \quad \angle MOE = \frac{d}{2} + d = \frac{3d}{2}$$

In $\triangle OME$

$$\sin \frac{3d}{2} = \frac{ME}{OE} \Rightarrow ME = \sin \frac{3d}{2} \times OE$$

$$E = 2ME$$

$$E = 2 \times OE \times \sin \frac{3d}{2} \quad \text{For 3 slots.}$$

For m slots

$$E_{\text{ph}} = 2 \times OE \times \sin \frac{md}{2} \quad [\text{Phasor sum}]$$

Finding arithmetic sum

Since magnitude of induced emfs are equal

$$AB = BC = CE = E_{\text{ar.}}$$

$$E_{\text{ar.}} = AB + BC + CE = 3 E_{\text{ar.}}$$

To find $E_{\text{ar.}}$

$$\text{In } \triangle OME \quad CE = 2 OE \sin \frac{d}{2} \quad \left[\sin \frac{d}{2} = \frac{OE}{CE} \right]$$

$$CE = 2 \left[OE \sin \frac{d}{2} \right]$$

$$E_{\text{ar.}} = 3 CE \Rightarrow 3 \left[2 OE \sin \frac{d}{2} \right]$$

for m slots

$$E_{\text{ar.}} = m \left[2 OE \sin \frac{d}{2} \right]$$

$$k_d = \frac{E_{\text{ph}}}{E_{\text{ar.}}} = \frac{2 OE \sin \frac{md}{2}}{2 OE m \sin \frac{d}{2}}$$

$$k_d = \frac{\sin \frac{md}{2}}{m \sin \frac{d}{2}}$$